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ABSTRACT

The Further Education Unit's (FEU's) current quality projects in Great Britain include Trialling TQM [total quality management], Maintaining Quality During Curriculum Change, and value-added work. The FEU value-added project consisted of a survey of 125 technical colleges to discover the extent of value-added activity and a short-term working group set up in response to the survey to develop the value-added work in further education. The survey demonstrated that there is widespread interest in the development of value-added methods and techniques and that, despite some interesting small-scale practice, few colleges had developed systematic ways of capturing the data needed to measure value added. The short-term working group of representatives from five colleges is continuing to work on defining, measuring, and reporting value added. Before undertaking the development work in their own colleges, members have needed to develop a shared understanding of the measurement of value added and the additional difficulties in applying such measures to the further education context. Measuring value added involves a longitudinal analysis of many individual student performances. Measuring value in further education is problematic because students on entry often have more diverse attainments than 16-year-olds and the curriculum includes many different vocational levels. A need clearly exists for resources and staff expertise to undertake development of value-added work in further education. (YLB)

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VALUE ADDED IN FURTHER EDUCATION

One aspect of FEU's continuing quality work

October 1993

Since the publication of Quality Matters (FEU 1991), FEU has continued work on several long-term quality projects. This bulletin:

- *provides an update of FEU's current quality work*
- *looks in detail at one of those projects*

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FEU'S QUALITY WORK: AN UPDATE

In addition to its value-added work, FEU's current quality projects include:

- **Trialling TQM** (RP 671)
  This project has been following two colleges as they have introduced TQM. It will report in the winter of 1993-4.

- **Maintaining Quality During Curriculum Change** (RP 742)
  This project has identified and is trialling a three-part instrument to monitor quality during periods of rapid curriculum change. It is also identifying good practice which will help course leaders and college curriculum managers maintain quality during the process of curriculum development. It will report in the spring of 1994.

Future publications, which will draw on a variety of recently completed development work will focus on:

- the use of service standards in FE;
- the integration within colleges of a variety of quality initiatives such as quality systems, Investors in People, curriculum review and evaluation, staff appraisal and human resource management (HRM).

Recent market research has demonstrated that, in addition to the above, there is an expressed need within colleges for:

- the development of a common quality framework;
- guidance on how to demonstrate to funding bodies and other agencies that quality systems are operating effectively and resulting in continuing improvement.

FEU is considering how best to continue to respond to these needs.

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VALUE ADDED IN FE

This bulletin:

- explores the uses of value added in FE;
- points to some ways forward;
- identifies some issues still to be resolved;
- shows how FEU will develop the work further.

What is value added?

The measurement of value added entails comparison between the characteristics and attainments of learners at entry (the input data) and their achievements at exit (the output data).

Through the aggregation of such measurements institutional and national norms can be computed. Comparisons can then be made between individual distance travelled and the outcomes predicted by these norms.

Why is there so much interest in value added in FE?

Current interest is high partly because colleges are being encouraged by external bodies, such as the Funding Councils, to develop internal quality assurance mechanisms (e.g. FEFC 93/11 and 93/28), but also because such measures may eventually provide ways of:

- enhancing objectively-based guidance to students at entry;
- motivating students on programme by setting realistic targets;
- monitoring internally the effectiveness of various parts of the college;
- assessing internally the achievements of a college and identifying areas for future action;
- expressing individual, section or institutional achievement with greater validity than raw examination or qualifications data;
- accounting for the use of public money.

In addition work initially undertaken in schools by the Audit Commission (1991) and the A-level Information System (ALIS) work (see below), have been extended with some success to the FE sector, and hopes are high that similar ways might be found to measure the value added by vocational programmes as well as A-level courses.

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A-level Information System

ALIS is based in the Curriculum, Evaluation and Management centre of Newcastle University and has been running for some ten years.

- It has provided value-added information for schools and more recently colleges, initially in the North East and now across the country.
- The analysis is based upon the work of individual departments and does not set out to give a global picture of school or college performance. It is argued that subject-by-subject analysis can give more useful and practical information for student guidance and staff development than any aggregate measure.
- The system depends on up-to-date analysis of individual A-level trends and performance year by year over large samples.
- In addition to the school or college examination results, ALIS also provides feedback data on student attitudes and on institutional characteristics in relation to teaching and learning policies.
- The ALIS approach is also being extended to a study of full-time vocational courses.
- ALIS is an example of how detailed and authoritative value-added information and analysis can be provided to schools or colleges from an external centre. The contract colleges make with ALIS determines in what form such information is delivered and will not provide the immediate responsiveness and accessibility of an in-house system. Schools and colleges need to have systems which capture and provide input and output data for ALIS.

FEU'S VALUE-ADDED PROJECT

The FEU project consisted of:

- a survey of 125 colleges to discover the extent of value-added activity in early 1992;
- a short-term working group set up in response to the survey to develop further the value-added work in FE, in relation to A levels, vocational programmes and non-traditional entry.

The survey demonstrated that:

- there was widespread interest in the development of value-added methods and techniques;
- despite some interesting small-scale practice, few colleges had developed systematic ways of capturing the data needed to measure value added. Colleges which had subscribed to the ALIS project were sometimes exceptions.

The short-term working group was set up with representatives from five colleges. Its remit was to work further on defining, measuring and reporting value added in further education. It was supported by a steering committee with specialists actively involved in this field. These included staff from Greenhead Sixth-Form College, the National Foundation for Educational Research (NFER), the Business and Technical Education Council (BTEC), the Schools Examination and Assessment Council (SEAC) and ALIS as well as other FE college representatives.

Before undertaking the development work in their own colleges, members needed to develop a shared understanding of:

- the measurement of value added;
- the additional difficulties in applying such measures to the FE context.

Measuring value added

Measuring value added involves a longitudinal analysis of many individual student performances. Confidence in the validity of measurements may be increased by using larger samples, for example by adding data from successive cohorts of students.Input and output data need to be agreed, captured and coded, usually via a standardised points system.

EXAMPLE: The Audit Commission (1991) used the following for GCSE and A level scores:

INPUT DATA

GCSE grade	A	B	C	D	E	F	G	U
Points awarded	7	6	5	4	3	2	1	0

OUTPUT DATA

A-level grade	A	B	C	D	E	O	U
Points awarded	5	4	3	2	1	0	0

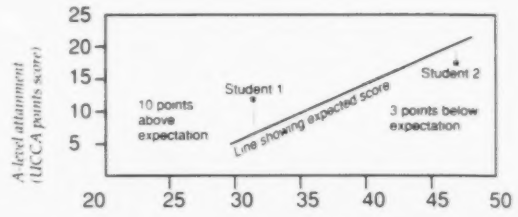
(based on the UCCA points system)

A statistically significant correlation must be established between input data and output data.

EXAMPLE: The Audit Commissions data on 1271 young people who took A levels in the summer of 1988 showed there was a significant correlation between GCSE scores and A-level results: that is the higher the GCSE points at entry, the higher the A-level scores are likely to be.

For ease of understanding, the whole range of individual scores can be plotted on a graph and then, using a statistical technique known as regression analysis, the national norm can be represented as a straight line. Once this has been done, subsequent individual or group scores can be plotted and compared with the norm.

The concept of value added



Thus student 2 has better A-level results than student 1 but a less good value-added result.
(*Unfinished Business*, HMSO 1993)

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More sophisticated statistical analyses, such as multi-level modelling techniques, which differentiate between such factors as gender or age in the measurement of value added, can also be employed. They can demonstrate whether, other things being equal, any overall value added is evenly distributed within a college or whether, for instance, it contributes more to older or male students (and thus less to younger or female students).

The analyses resulting from such methods do seem to have the potential to meet many of the requirements of the FE system; for example, to have quality measures that demonstrate FE's effectiveness to outside agencies and enhance internal quality management. There seems therefore to be a strong case for pursuing further the use of value added measurement in FE.

So far the examples have related to the GCSE and A-level results of young people in schools, and apart from some technical concerns about the comparability of various subjects and examination boards, such value-added techniques have gained considerable credibility over recent years. However once the move into further education is made, **additional difficulties are encountered**.

Value-added measures in FE

Measuring value added in FE is more problematic because:

- FE students on entry often have more diverse attainments than 16 year olds;
- the FE curriculum includes many different vocational programmes as well as A levels.

The implications of this for measuring value added are:

Student diversity

GCSE scores may not be valid input data for FE students whose attainment levels on entry may have more to do with life experiences than GCSE or O-level results many years previously. For example, the starting points in one college programme reviewed by the project varied from graduates to people with no formal qualifications at all. Thus there will probably be a need to find alternative input data for many FE students.

Vocational programmes

The correlation between GCSE scores and the successful achievement of vocational qualifications is much weaker than that between GCSEs and A levels. Given that GCSEs and vocational qualifications are assessing different sorts of learning this should not be surprising. The closer the learning requirements of a vocational programme are to the sort of learning required for A levels, the greater the correlation with GCSE scores. Thus for example BTEC National Diplomas in Business Studies or Science have greater correlation with GCSE scores than those for Leisure Studies or the Performing Arts. Again this means that alternative input data will be required to measure value added.

The grades awarded for achievement on vocational programmes may be less finely differentiated than GCSEs and A levels. For example, in relation to NVQs, students are assessed as simply competent or not. This will limit the extent to which the distance travelled can be calibrated and finely analysed. This problem is exacerbated if, in addition, students coming onto a programme have very similar GCSE grades. In this case both the input and output data would lack differentiation.

Many vocational programmes do not have a single form of accreditation such as A levels. For example, many programmes are assessed on a unit basis. This necessarily complicates the simple scoring system used for input-output measurement with GCSEs and A levels.

Despite these technical difficulties, but with an understanding of them, colleges in the project undertook short-term, often retrospective, analyses of data within their own institutions, in an attempt to develop the use of value added techniques in FE further. For example:

College A with a large and varied portfolio of GCSE and A-level programmes, investigated the characteristics of its mainly adult student groups, for whom value added cannot be measured using an input score based on GCSE results alone. A questionnaire was used to obtain information about such factors as motivation, prior qualification, general academic attainment, period of absence from formal education, and age.

As sources of data, the college also drew on its information system, paper-based departmental student records, and computerised records of student attendance held on a database.

The college's catchment area is also served by a sixth-form college and the prospect of public comparison of results was an incentive to the college to find ways of identifying and highlighting the strengths of its programme.

From the college's experience it became clear that a vast amount of work would need to be done to achieve valid and reliable measurements of value added for a very heterogeneous student population. While the complexity of the task was convincingly demonstrated, the results in terms of measurement of value added were meagre.

This college, outside the project itself, also used value-added techniques to test the effectiveness of new methods of teaching spelling to students on vocational courses. Both sample and control groups were tested, and statistical analysis of the final test scores enabled the tutors involved to distinguish between the learning gain attributable to the new teaching methods and the level of performance predicted by initial testing.

College B is a large tertiary college with major regional and some national functions. It has a full-time equivalent (FTE) student roll of 5000 with 400 FTE teaching staff.

One of the vice-principals has developed his own interest in value-added measurement by creating a dedicated database applying originally to full-time general education students, and recently extended to full-time vocational students.

While the college's main management information system (MIS), Fretwell-Downing, supports the value-added project through its Examinations Entry module, the main analysis is carried out on an Acorn Archimedes micro-computer, using software refined over several years.

The recent extension of work to vocational areas means that the kinds of analysis carried out for A-level students can now be used for many BTEC National Diploma programmes.

The database permits the following analyses: guidance and placement work with individual students; target-setting and development work with departmental and programme staff; trend-spotting in overall college performance; analysis of performance by age, gender, prior attainment and feeder institution.

The location of the system (with its expertise) in the senior management of the college ensures that its potential is recognised in terms of overall college development. However, the capacity of the main MIS to include the value-added database would certainly enlarge its use and influence.

During the lifetime of the project FEU became aware of a number of other colleges developing value added techniques. These include:

College C, a small college serving a mainly rural catchment area, which carried out a project funded by the National Council for Educational Technology (NCET) to extend the college's computerised MIS to monitor student progress in terms of value added. The facilities provided by EMIS have been extended, and additional information taken from student record cards has been assimilated. A scoring system covering the relevant range of academic and vocational examination results has been applied to obtain input and output data. The college sees the benefit to staff in terms of being able to offer predictions of student performance, identify needs for specific tutorial support, and easily provide information for external agencies. The students benefit from better targeted guidance and support.

College D, a college with a well established track record of innovation, has been trialling the use of standardised psychometric tests for initial diagnostic assessment of non-standard applicants for BTEC National programmes. Test results have been used as a basis for initial guidance and the design of on-course learning support. The assessment team has compared the performance of college students with national norms, and has generated local norms from the data collected. The predictive validity of the assessments has been reviewed by comparing test results with subsequent performance on relevant BTEC modules. As a result, the team has recommended that a variety of appropriate forms of aptitude, attainment and diagnostic testing should be adopted to assist selection and guidance. The aptitude tests used in the trial could be applied to best advantage as a tool for screening students likely to need additional learning support.

GENERAL FINDINGS

- There is a need to develop in colleges a shared understanding of the concepts and methods associated with value added, and the uses to which such measures can be put.
- Many colleges are unable to access the necessary data for value-added calculations from their CMIS.
- Statistical data can be successfully analysed for value-added purposes using commercially available statistical software packages and databases.
- Earlier research, indicating that the standard value-added method of relating final outcome to starting qualification can be usefully applied in FE, was confirmed.
- The Audit Commission's finding, that GCSE scores do not generally provide valid input data for measuring value added on vocational programmes, was confirmed.
- It is difficult to find a single methodology for recording input data for adults which would be equivalent to GCSE scores for younger students.

UNRESOLVED ISSUES

The experience of the project colleges and others shows clearly that there is a need for further work to:

- ensure that college MIS make provision for the requirement to gain easy access to student input and output data;

  Recent evidence from FEU projects has shown that many colleges consider their MIS inadequate to meeting the developing demands placed upon them by external agencies and by the need to manage an increasingly flexible curriculum.

  This project confirmed this view in relation to measuring value added. Unless data on student characteristics and attainments are at the heart of college information systems, value-added systems will continue to be idiosyncratic, free-standing and dependent on the expertise and ingenuity of individual staff.

  This issue is explored in more detail in the recent bulletin, *Management Information Systems and the Curriculum* (FEU, 1993). FEU will continue to co-operate with the National CMIS Board, The National Association for Information Technology in Further Education (NAITFE) and NCET in its work on this subject.

- ensure that staff generally are aware of the potential value of student records in the measurement of value added and thus of the importance of recording information systematically and keeping the records in a safe yet accessible place;

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- explore and attempt to validate a wider range of predictive and diagnostic tests as substitutes for GCSE input data for adults and in relation to many vocational programmes;
- examine the implications of the restricted grading range of GNVQs for the measurement of value added;
- demonstrate convincingly to colleges the ways in which the technical difficulties associated with the measurement of value added in FE can be overcome;
- show how the measurement and analysis of value-added data can help colleges give a better service to students and enable them to manage quality internally as well as meet the requirements of external agencies.

Despite these unresolved issues and indeed the difficulty in finding the resources and staff expertise required to undertake this work, colleges already working in this area are doing so because they believe value-added analyses can help them deliver:

- increased student satisfaction;
- better retention rates;
- higher productivity;
- enhanced standing with funding agencies.

They also seem to have recognised the need within colleges for:

- senior managers with an understanding both of the potential of value added for guidance, curriculum management and public accountability purposes and of the need for statistical rigour;
- statistical expertise;
- access to expertise in information systems design and programming;
- staff development to raise awareness of the requirements and applications of measuring value added.

FEU will continue to support the development of value-added work in FE, with phase 2 of this project starting in the autumn of 1993. During the academic years 1993-5, FEU will work closely with five colleges, trying to find ways to overcome some of the technical difficulties involved in measuring value added with a diverse student population on a variety of academic and vocational programmes. Advanced GNVQs (level 3) will provide the focus for much of the work.

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